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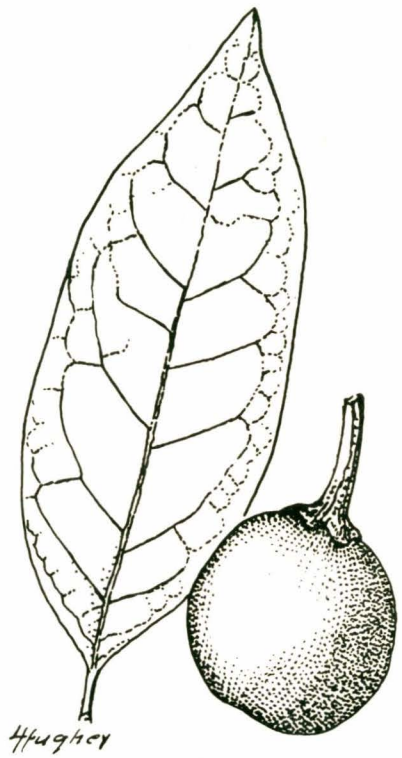
UMBELLULARIA

(California-laurel)

California-laurel, the only species of this genus, is native in California and southwestern Oregon, where it is also known as Oregon-myrtle. It is a broadleaf evergreen tree, usually with a forked trunk and with dense broad crown of shiny foliage. The bark is dark red brown, thin, with flat scales. The light green twigs have naked buds. Leaves are alternate, lanceolate or elliptic, entire, thick and leathery, shiny dark green, and shed the second year or later. They have an aromatic odor and peppery taste.

Clusters of several small greenish yellow flowers are borne at leaf bases in late winter and early spring, before the new leaves. The fruits, 2 or 3 together, mature and fall in late autumn. These large yellow-green berries are elliptic-shaped or nearly round, almost filled by the large seed.



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CALIFORNIA-LAUREL (*Umbellularia californica* (Hook. & Arn.) Nutt.)

Other common names: Oregon-myrtle, Pacific-myrtle, pepperwood, spice-tree, mountain laurel, California bay tree, myrtle tree, California olive, myrtle, laurel, California sassafras, yellow myrtle, black myrtle, white myrtle, bay, bay laurel, cajeput-tree, cinnamon bush, and Coos Bay laurel.

Easily recognized by its aromatic evergreen leaves and prized for its wood, California-laurel is unique among western hardwoods. The distinctive yet confusing characteristics of this monotypic genus are reflected by names it has been called. Its present scientific name was preceded by at least five other combinations (*8*).[1] The common names derive from leaf, fruit, or wood characteristics and also from similarities mistaken for relationships with the myrtle trees of the Holy Land and the cajeput of the East Indian Islands (*8*).

California-laurel has a more extensive distribution than commonly realized (fig. 1). Its range spans more than 11 degrees of latitude, from below the 44th parallel in the Umpqua River Valley of Douglas County, Oreg., to south of the 33d parallel in San Diego County, Calif. In the Sierra it is found as far south as the basin of the south fork of the Tule River and in the Coast Range near the Mexican border.

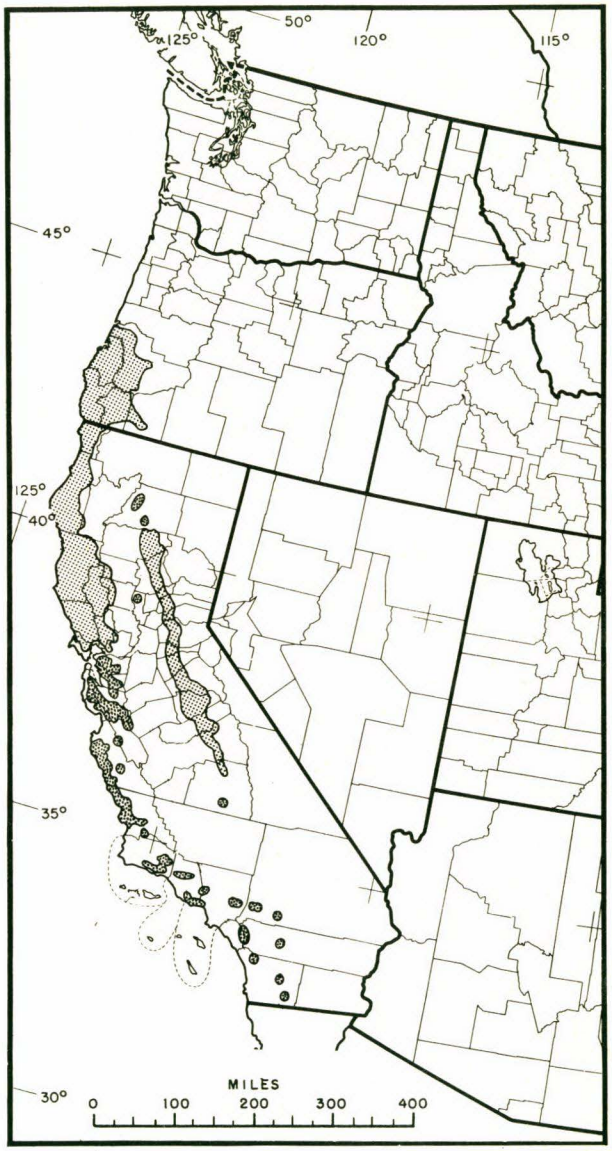
HABITAT CONDITIONS

Climate

California-laurel grows over a broad span of cool-humid and hot-dry atmospheric conditions. Laurel has endured temperature extremes of 114° and −6° F. Average annual temperatures at representative stations range from 52° to 59°; January averages range from 38° to 54° and July from 56° to 78°. Average annual rainfall varies from 25 to 71 inches (Sierra Madre and Delta, respectively) and average anual snowfall varies from zero to about 70 inches. Rainfall in the growing season (April through September) ranges from 4 to 13 inches. Higher and lower values for precipitation and temperature data undoubtedly occur where laurel is native.

Soils and Topography

California-laurel grows on many soil types and textures if soil moisture is constant and plentiful. In shrub or tree form it is found on soils derived from alluvial deposits, from sedimentary rock, from volcanic flows of the Cascades and Sierra, and from older formations in the Siskiyou Moun-



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The range of California-laurel.

[1] Italic numbers in parentheses refer to Literature Cited, p. 747.

tains, including serpentine (*17*). Best development and most rapid growth is on deep, well-drained alluvial fills and valley bottoms subject to inundation by high water. Growth is also good on well-watered sedimentary soils of the coastal slopes and along higher foothill streams. In dry climates laurel characteristically grows on the gravelly outwashes at the mouths of canyons and in spring-watered gulches.

California-laurel grows over a wide elevational range. In Oregon and most of California it grows from sea level to 4,000 feet elevation. Near the southern end of its range, the lower altitudinal limit rises to 2,000 feet on south slopes of the San Bernardino Mountains and the upper limit approaches 6,000 feet on the west slopes of the San Jacinto Mountains. In the Sierra it reaches 5,000 feet in Kaweah Basin west of Sequoia National Park (*8*).

Associated Trees and Shrubs

Generally, California-laurel is found in mixture with other species but pure stands are not uncommon. Choice pure stands were eliminated when coastal and inland valleys were cleared for agriculture and only scattered groves and tracts of large mature trees remain. Pure stands of tall young-growth are also scarce, but pure thickets or prostrate mats are common on coastal bluffs and canyons in California (*8*).

California-laurel occurs as a minor component of four forest cover types: Pacific Douglas-Fir (Type 228), Port-Orford-Cedar—Douglas-Fir (Type 231), Redwood (Type 232), and Oak—Madrone (Type 234). Other associates in various parts of its range include western redcedar, western hemlock, Sitka spruce, grand fir, Pacific yew, bigleaf maple, black cottonwood, California black oak, tanoak, canyon live oak, Oregon white oak, Oregon ash, red alder, white alder, California sycamore, California buckeye, California torreya, California live oak, and hollyleaf cherry (*5*, *9*). It also associates with ponderosa pine near Waldo, Oreg.

Shrubs and herbaceous species are almost absent beneath laurel's closed canopy (*5*). Only mosses, ferns, and laurel seedlings thrive in the limited light and cool, moist conditions. Increasingly open canopies permit more complex vegetation and greater density. The following shrubs and vines were observed under one tall, pure stand of varying density near Roseburg, Oreg.: western common snowberry (*Symphoricarpos albus*), California dogwood (*Cornus californica*), grapeleaf California dewberry (*Rubus ursinus* var. *vitifolius*), cutleaf blackberry (*Rubus laciniatus*), Himalaya blackberry (*Rubus procerus*), and elder (*Sambucus* spp.), in addition to seedlings. In southern California associated shrubs include woolly manzanita (*Arctostaphylos tomentosa*), Jimbrush ceanothus (*Ceanothus sorediatus*), and golden evergreenchinkapin (*Castanopsis chrysophylla* var. *minor*) (*5*). California-laurel's associates include both moist and dry site shrubs.

LIFE HISTORY

Reproduction and Early Growth

Seed production and dissemination.—California-laurel flowers regularly and often profusely. Flowering has been reported to occur in all months from December to May, beginning before new leaves appear (*8*, *12*, *13*). The flowering period is extended into late spring and early summer by the occasional appearance of flowers that originate in the axils of the current year's developing leaves. Trees flower at an early age; flowers have been observed on short whiplike shrubs and on 1-year-old sucker growth that originated from a long broken stub. Insects appear to be the chief aids to pollination.

Seedcrops are abundant in most years. Although umbels bear 4 to 9 flowers, generally only 1 to 3 fruits set (*8*). Seeds are produced in abundance after trees are 30 to 40 years old.

The fruit ripens and falls in autumn following flowering. The drupe, containing a single nutlike seed, is distributed by gravity and water, although squirrels and other rodents may have a small part in seed distribution through their storage activities. The seeds appear to have transient viability under some natural conditions.

The nuts are consumed in quantity by rodents and hogs. Silver gray squirrels and dusky-footed wood rats feed on them extensively (*2*). Hogs grow fat on laurel seeds but their meat acquires a peculiar flavor (*8*).

Seedling development.—Seeds may germinate in autumn soon after falling, or in late winter or early spring (*8*). Near Roseburg, Oreg., seeds germinate in the spring. Covered seeds germinate best but the large seeds do not become buried readily without ground disturbance or silt deposition by high water. Seedling establishment is uncommon in the drier parts of California except in protected areas and where the soil is well disturbed (*8*).

Germination is hypogeous and the seed remains attached to the seedling until midsummer, when the plant may be 6 to 8 inches tall. Seedlings soon develop a moderately stout taproot.

Vegetative reproduction.—California-laurel sprouts prolifically from the root collar, stump, and trunk. Sprouts and suckers develop wherever a canopy opening admits strong light from the side or overhead. Large trees ringed with root collar sprouts and both fallen and standing live

trunks entirely enveloped in new dark green sucker growth are common (*8*). Multiple-stemmed clumps from open-grown sprouts typically assume a distinctive, very dense, and symmetrically rounded shape.

Sapling Stage to Maturity

Growth and yield.—California-laurel matures either as a shrub or a tall forest tree. It makes best growth and development in the protected bottom lands of southern Oregon and northern California where many mature trees are 3 to 6 feet in diameter and more than 100 feet tall (*8*). A maximum diameter of 11.7 feet (*1*) and a maximum height of 175 feet have been reported. Over much of its range, laurel usually attains heights of 40 to 80 feet and diameters of 18 to 30 inches; but near the ocean, in the chaparral, and on other severe or rocky sites it is confined to prostrate or shrub sizes. However, even in a dry, hot climate it can become a large tree on moist sites; specimens of unusual size, diameter, crown spread, and age can be found in many California counties.

Although California-laurel growth is rated ordinarily as slow on good sites, in southern Oregon height growth averages between 1 and 2 feet per year. Trees in one dense pure stand were 98 to 112 feet tall and 9 to 24 inches d.b.h. at only 64 to 98 years of age. In a small opening, an 18-year-old sapling was 22 feet tall and 2.2 inches d.b.h. Another tree under a closed canopy was 36 years old, 80 feet tall, and 7.0 inches d.b.h. The stand averaged 320 stems to the acre, including 288 that were 7 inches or more d.b.h. and 168 that were 12 inches or more. These observations indicate that laurel is capable of rapid growth in a full stand.

Development of multiple trunks is characteristic in both open-grown and closed stands. Trees in the open often attain a crown spread greater than their height and may lose all trace of a central trunk. Many forest-grown trees also fork repeatedly, often within the first 10 feet above ground. Generally each fork grows vertically and the side branches die. Adjacent forked and unforked trees make similar height growth.

Reaction to competition.—California-laurel's degree of tolerance is uncertain (*3*). A very dense canopy is formed by its thick evergreen leaves, which persist 2 to 6 years. That laurel is not tolerant of its own shade may be indicated by the presence of many small seedlings but no saplings under a closed canopy, and long boles clear of live limbs. However, these indicators are no criteria of relative tolerance with other species, and large trees are found beneath a moderately dense conifer canopy.

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A stand of 80- to 90-year-old California-laurel near Roseburg, Oreg.

Principal enemies.—Wind and snow cause appreciable destruction and deformation in California-laurel stands. Blowdown is common during severe north or southeast wind and rain storms in California. Storms in southern Oregon during the winters of 1951 and 1955, coming at a time when the soil was saturated or flooded, blew down numerous trees in one dense pure stand on alluvial soil. Wet clinging snow in 1955 aided windthrow, broke tops, and split forks. Laurel roots are generally described as fleshy, deep, and wide-spreading, but this blowdown demonstrated that the root system may also be quite restricted and without a prominent taproot. Striking examples of crown deformation by strong winds are numerous near the coast, and no California tree responds more easily to molding by wind (*8*).

Because of its thin bark the tree is easily top-killed by fire, but it sprouts very rapidly. It often forms dense brush clumps on burned cutover land, which may prevent the establishment of desired conifers.

More than 40 species of fungi have been observed on California-laurel, but only 3 (*Anthostoma oreodaphnes*, *Nectria umbellulariae*, *Sphaerella umbellulariae*) are restricted to this tree. Few fungi cause serious damage to the living tree. In California, a severe outbreak of laurel leaf blight followed abormally heavy precipitation in

two of three winters. A bacterium, *Pseudomonas lauracearum*, and two fungi, *Katatiella phoradendri* f. *umbellulariae* and *Colletotrichum gloeosporioides*, were isolated from affected leaves. Though crowns of some trees turned entirely brown, no trees were killed. Infected leaves were shed and crowns leafed out anew the following year. Twig and new shoot dieback was substantial, however, and was followed by scattered mortality of limbs up to an inch in diameter. Leaf blight of epidemic proportions is rare on California-laurel and likely causes little lasting damage.

Wood rot is common in California-laurel. Rainbow conk (*Polystictus versicolor*), a saprophyte that attacks dead wood and wood in storage, is the chief offender.[2] Even in young stands, dead knots, stem malformations, and root collars are often decayed. Total cull in one northern California study averaged 7 and 10 percent of the gross cubic volume in trees of saw-log or cordwood size and quality, respectively (*10*).

California-laurel has no serious insect enemies. A leaf miner (*Cameraria umbellulariae*) and a leaf beetle (*Dichelonyx valida*) cause some damage to live leaves. An imported scale (*Icerya purchasi*) used to be very damaging but through biological means it is now under control. Another scale insect (*Aspidiotus camelliae*) is often numerous on the bark but is of only minor importance.

Animals cause only minor damage to California-laurel. Goats graze it sparingly, but cattle seldom, if ever, browse it unless other food is extremely scarce. Hogs eat the roots. It is a principal game browse species for the North Coast ranges of California (*11*). Probably the "hedging" of sprouts by deer is the only significant damage.

Special Features

All parts of the tree have served human needs. Hudson Bay trappers brewed a tea from the leaves to remedy chill. Native Indian tribes ate substantial amounts of the fruit and seeds, made a drink from the bark of the roots, and used the leaves for many internal and external medicinal purposes, including vermin control (*4*). Dried leaves are used for seasoning meats and soups (*12*).

Extracts of the leaves, wood, and fruit have strong chemical properties. Vapor from the aromatic leaves can cause sneezing, headache, sinus irritation, and other severe discomforts, and even unconsciousness (*6*). The leaves contain considerable menthol, and the ketone, umbellulone, obtained from oil interferes severely enough with respiration, heart beat, and blood circulation to cause death in laboratory animals (*6*). Umbellulone also has germicidal properties (*6*). Oil from the wood, leaves, and fruit has been used for treating various diseases, but is probably no longer sold for pharmaceutical purposes (*15*).

RACES AND HYBRIDS

Several varieties are recognized. *Umbellularia californica* var. *pendula* Rehd. is an uncommon, broad-spreading tree distinctive for its pendulous branchlets which contrast strongly with typical ascending branch growth. *U. californica* var. *fresnensis* can be distinguished by the fine white down on the lower surfaces on the leaves and on the branches of the panicle (*7*). Other dwarf and prostrate forms may be additional varieties (*8*).

Revised from "Silvical Characteristics of California-Laurel," by William I. Stein. U.S. Forest Serv. Pacific Northwest Forest and Range Expt. Sta. Silv. Ser. 2, 16 pp. 1958.

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